however, the nerve of one eye is caused to atrophy, the corresponding optic tract still contains the uncrossed fibers for the remaining eye. Owing now to the atrophy of the bulk of the fibers in this tract, the fibers remaining aggregate, and thus do form a bundle in such a specimen. It was this appearance which led v. Gudden and Ganser to describe these fibers as forming a bundle in the normal animal.

Ueber die Chiasma Nervorum opticorum des Menschen. ST. BERNHEIMER. Bericht über den VII intern. Opthalm. Congr. zu Heidelberg, 1888, S. 317. Abstract by Steinach, Centralbl. f. Physiologie, No. 25, März, 1889.

The same problem is attacked by Bernheimer by quite another method. He has studied the development of the medullary sheath of the optic fibers in foetuses and young infants. Before the 30th week of embryonic life, the medullary sheaths are undeveloped, and the chiasma at this period is formed by a network of axis cylinders imbedded in vascular connective tissue. Not until the 30th week do branched particles, staining by Weigert's method, appear. In older embryos these gradually become larger and more branched and finally fuse, thus marking out very fine medullated fibers. These latter increase both in size and number during the remainder of intra-uterine life, but it is not until the second or third week of extra-uterine life that a section is made up of fibers all of which are medullated; these in turn increase in diameter up to the end of the first year of infancy. In this last stage the fibers are too numerous and interwoven to permit the observation of the course of single fibers. If, however, complete series of thin sections are examined from specimens between the 30th week of intra-uterine and the 3d week of extra-uterine life, there are always to be found fibers which enter the right optic tract from the right nerve and the left from the left, *i. e.* do not decussate. They run mainly in the dorsal half of the chiasma.

Aneurism of an Anomalous Artery causing Antero-Posterior Division of the Chiasm of the Optic Nerves, and producing Bitemporal Hemianopsia. S. WEIR MITCHELL. Journ. of Nervous and Mental Diseases, Jan., 1889.

In 1886 a man of 43 years presented himself as a patient, exhibiting as chief symptoms fatigue after unusual exertion, a tendency to numbness in the limbs, and, for a year previous, varying and gradually increasing pain in the parietal and vertex regions. An examination of the eyes showed complete anaesthesia of the nasal half of each retina. The color sense was unimpaired. The diagnosis was pressure in front of the chiasma, sufficient to cut off the connection between the inner halves of each retina, with partial atrophy, especially in the left nerve, inferred from the diminished acuteness of vision. The headaches continued, and later there was at times a passing sense of mental confusion. In May, 1887, he died suddenly, having been for some hours comatose.

At the autopsy the optic nerves were found separated fully an inch by a large tumor that lay directly between them. The tumor had apparently destroyed the chiasma and pressed deeply into the brain substance in the middle line, though not adherent to it. The two internal carotids were found intimately connected with and appa-

rently forming the tumor. To explain this it is assumed that an anomalous artery connected the carotids at the point just below the chiasma, and this becoming aneurismal, caused the destruction of the chiasma, and forced its way into the brain substance above. The case is unique, and shows the partial crossing of the optic fibers in man, as well as the portions of the retina with which the two groups of fibers are respectively connected. Neither the optic nerves nor the brain were in a condition to permit of a microscopical examination. The paper closes with a discussion of the anomalous connecting branches observed in the circle of Willis, with a view to fully justifying the statement that the tumor was due to an aneurism in an anomalous artery.

Zur Physiologie des Vogelgehirns. M. E. G. SCHRADER. Pflüger's Archiv, XLIV, S. 175. Reviewed by Paneth in Centralbl. f. Physiol., März, 1889, No. 25.

This interesting paper opens with a discussion of previous investigations of the bird's brain, and has to urge against much that has been done, both the failure of the experimenters to treat the problems in a thoroughly objective way, and to control their results by suitable autopsies. It has been possible to remove the forebrain completely without injury to the remaining portions. The mortality immediately after operation is high, and of those that live for weeks after it, a portion show progressive emaciation and stupor, terminating in death. In the first days after operation the animals exhibit as a rule stupor and lack of voluntary motion, as described by Flourens. After this they move about the room, avoiding obstacles, even such as a dusty plate of glass, and can climb out of a cage with high sides. In the early stages they can easily be put to sleep by holding them or putting them on a perch, which shows that the movements are not forced. At night they roosted naturally. When placed on a rotating object they balanced very well for a time, and then flew off, evidently choosing the object towards which they flew. Alighting was accomplished with ease, but they could not rise from a flat surface like the floor. In some cases the period of stupor did not occur, and the animal moved about almost immediately after the operation in a way which showed that it could see fairly well from the very first. The reaction to sound was obtained with a percussion cap, by the explosion of which they were startled. The tests of other senses were not satisfactory, for Schrader did not get any good reactions on normal birds with which they could be compared. Birds without the forebrain did not eat voluntarily, but, as is well known, could swallow food fed to them. The operated birds slept, and became restless when left for too long a time without food. They showed heat, though they did not recognize the female, and a mother could not feed her young. The whole activity of such birds is reduced to the simplest terms.

Other birds were rendered blind. When the behavior of these was studied, it was found that they were in certain ways more defective than those without the forebrain. They could feed, but did so only at long intervals. They could not orient themselves, and remained for days resting on a perch, though it was close to the floor. The loss of sight evidently deprived them, as might be expected, of the majority of their most important sensations. So far as observed, no compensation through other senses took place.